PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference Hi-bu 031391wo	**FOR FURTHER ACTION**	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/EP 03/08871	International filing date *(day/month/year)* 09.08.2003	Priority date *(day/month/year)* 09.08.2003
International Patent Classification (IPC) or both national classification and IPC F03D11/04		
Applicant GENERAL ELECTRIC COMPANY et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 5 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the opinion
   - II ☐ Priority
   - III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
   - VI ☐ Certain documents cited
   - VII ☐ Certain defects in the international application
   - VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
25.02.2005	05.09.2005
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Avramidis, P Telephone No. +49 89 2399-7317

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/EP 03/08871

I. Basis of the report

1. With regard to the **elements** of the international application *(Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17))*:

Description, Pages

1-9 as originally filed

Claims, Numbers

1-12 received on 13.08.2005 with letter of 12.08.2005

Drawings, Sheets

1/5-5/5 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

   These elements were available or furnished to this Authority in the following language: , which is:

   ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).

   ☐ the language of publication of the international application (under Rule 48.3(b)).

   ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

   ☐ contained in the international application in written form.

   ☐ filed together with the international application in computer readable form.

   ☐ furnished subsequently to this Authority in written form.

   ☐ furnished subsequently to this Authority in computer readable form.

   ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

   ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

   ☐ the description, pages:

   ☐ the claims, Nos.:

   ☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

   (Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-12
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-12
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-12
	No:	Claims	

2. Citations and explanations

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

The present invention relates to the field of tower constructions for wind turbines.

Various tower constructions are known in the art, for example from US-A-4 217 738 (D1) or WO 02/27105 (D2).

The increased demand for wind energy leads to increased rotor diameter size of the wind energy turbines and consequently this requires increased heights of the towers.

It is an object of the present invention to provide a hybrid tower comprising a tower segment made of concrete and a tower segment made of steel wherein the connection between the segments is improved.

With the features of claim 1 the ability to handle shear forces in the concrete tower segment, which are resulting from lateral loads acting on the steel tower segment is improved by an advantageous distribution of said shear forces into the embedded end portion of the steel tower segment in combination with the anchoring elements.

None of the prior art documents which have become known to this Authority discloses all the technical features of independent claim 1.

Furthermore, the solution to the above mentioned problem in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) since it is not taught or suggested by the prior art documents.

Claims 2-12 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

Therefore, the present application meets the requirements of Article 33(2) and (3) PCT, because the subject-matter of claims 1-12 is new and involves an inventive step.

Certain defects in the international application

1. Independent claim 1 is not in the two-part form in accordance with Rule 6.3(b) PCT, with those features known in combination from the prior art (document D1 or D2) being placed in the preamble (Rule 6.3(b)(I) PCT) and with the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).

2. Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the documents D1 and D2 is not mentioned in the description, nor are these documents identified therein.

CLAIMS

1. A tower, in particular for a wind energy turbine, comprising:
   - a tubular first tower segment (18) having a wall (20) comprising concrete material and
   - a tubular second tower segment (26) having a wall (28) comprising steel,
   - wherein the wall (28) of the second tower segment (26) comprises an end portion (30) embedded in an embedment portion (32) of the wall (20) of the first tower segment (18), and
   - wherein the second tower segment (26) within its embedded end portion (30) comprises at least one anchoring element (38,40,52) projecting radially from an inner or an outer surface (42,44) or both inner and outer surfaces (42,44) of the wall (28) of the second tower segment (26), the anchoring element (38,40,52) being arranged along an axial direction of the second tower segment (26).

2. The tower according to claim 1, wherein the first tower segment (18) is cylindrical or conical.

3. The tower according to claim1 or 2, wherein the second tower segment (26) is cylindrical or conical.

4. The tower according to any one of claims 1 to 3, wherein the anchoring elements (40) further have an enlarged free end portion opposite to the wall (28) of the second tower segment (26).

5. The tower according to claim 4, wherein the anchoring elements (40) having enlarged free end portions further comprises headed studs.

6. The tower according to any one of claims 1 to 5, wherein the anchoring elements (38) extend contiguously in a circumferential direction of the second tower segment (26).

7. The tower according to claim 6, wherein the contiguous anchoring elements (38) further comprise annular portions.

8. The tower according to any one of claims 1 to 7, wherein the anchoring elements (38,40,52) are welded to the wall (28) of the second tower segment (26).

9. The tower according to any one of claims 1 to 8, wherein the wall (20) of the first tower segment (18) further comprises a reinforcement element (46,50) in at least its embedment portion (32).

10. The tower according to claim 9, wherein the wall (20) of the first tower segment (18) comprises pre-stressed concrete in at least its embedment end portion.

11. The tower according to claim 10, wherein the wall (20) of the first tower segment (18) comprises pre-stressing elements (46) axially extending through at least the embedment portion (32) and arranged so as to face the inner surface (42) or the outer surface (44) of the embedded end portion (30) of the second tower segment (26).

12. The tower according to claim 11, wherein the anchoring elements (38,40,52) are arranged at that surface (42,44) of the embedded end portion (30) of the wall (28) of the second tower segment (26) adjacent to the pre-stressing elements (46) of the first tower segment (18).